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10/748,410

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Fay Chong JR.

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SUN/BLAKELY

12400 WILSHIRE BOULEVARD, SEVENTH FLOOR
LOS ANGELES, CA 90025-1030

EXAMINER

LE, MIRANDA

ART UNIT

PAPER NUMBER

2167

DATE MAILED: 08/04/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/748,410

Applicant(s)

CHONG, FAY

Examiner

Miranda Le

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-46 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-46 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

1. Claim 11 is objected to because of the following informalities: Claim 11, line 4, *wtih*” should be changed to “*with*”.

Appropriate correction is required.

2. Claims 1, 15, 29, and 43 recite the limitation "the first image" in the last line of the claims. There is insufficient antecedent basis for this limitation in the claims.

Appropriate correction is required.

Claim Rejections - 35 USC § 101

3. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter or any new and useful improvement thereof, may obtain a patent therefore, subject to the conditions and requirements of this title.

Claims 1-46 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claim 1 fails to provide a practical application that produces a useful, concrete and tangible result. Claim 1 only appears to produce a tangible result under a condition when data corresponding to the second data is stored in the second image. Under all other conditions, i.e. when data corresponding to the second data is not stored in the second image; no result is produced, only a determination which is neither applied in a practical application nor made available for use occurs.

Claim 29 is an apparatus claim, and claim 43 is a data storage system claim that perform the method of claim 1, and have the same type of issues as claim 1, therefore, are rejected under similar rationale.

Claim 15 has the same type of issues as claims 1, 29, 43, therefore, is rejected under similar rationale. In addition, the specification, paragraph [0026], defines “a machine-readable medium” as including both storage media (i.e., memory) and communication media (i.e., carrier waves, signals). A machine-readable medium including carrier waves, or signals, is non-statutory subject matter as set forth in MPEP 2106 (IV)(B)(2)(a). As such, claim 15 is not limited to tangible embodiments, the claim is not limited to statutory subject matter and is therefore non-statutory.

Claims 2-14, 15-28, 30-42, 44-46 are dependent upon claims 1, 15, 29, 43, respectively, suffer from deficiencies similar to their respective base claim, and therefore are likewise rejected.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless:

(e) the invention was described in

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-2, 4-7, 9-11, 13-16, 18-21, 23-25, 27-30, 32-35, 37-39, 41-46 are rejected under 35 U.S.C. 102(e) as being anticipated by Ito et al. (US Patent No. 7,031,986).

Ito anticipated independent claims 1, 15, 29, 43 by the following:

As to claims 1, 15, 29, 43, Ito teaches a method for preserving data in a data storage system, the method comprising:

receiving a command (i.e. The database management system 31 commands the database system 10 to temporarily stop the operation of its I/O controller, col. 4, lines 33-38) to preserve data in the data storage system (i.e. to maintain the consistency between administrative data and main data, col. 4, lines 39-47), (col. 4, lines 29-53);

executing, for a first data, a first input/output (I/O) process directed to a first storage volume (i.e. storage devices 11b and 11d, Figs. 5A-5B), wherein the first I/O process (i.e. the operation of its I/O controller, col. 4, lines 33-38) begins at a first time which is prior to receiving the command (col. 4, lines 29-53);

creating a data structure (i.e. before-image log which is stored in the storage device 11a as part of the administrative data, col. 5, lines 66-67), in response to the command, for at least a second image which corresponds to a second storage volume (i.e. storage devices 11a and 11c, Figs. 5A-5B), (col. 5, lines 11-26; col. 5, line 52 to col. 6, line 9);

writing a second data directed to the first storage volume (i.e. there may have been some active transactions when the storage devices 11b and 11d were detached, col. 5, lines 21-22) as part of a second I/O process which begins after the first time (col. 5, lines 11-26; col. 5, line 52 to col. 6, line 9); and

determining from the data structure whether data corresponding to the second data is stored in the second image (i.e. a before image, col. 6, lines 56-59) and if it is (i.e. scans the after-image, col. 7, lines 1-7), modifying the data structure to indicate that the second data is not stored in the second image (i.e. discarded, col. 6, lines 56-59) and storing the second data in the first image (i.e. the after-image, col. 7, lines 1-7), (col. 6, line 42 to col. 7, line 29).

As to claims 2, 16, 30, Ito teaches the first storage volume (i.e. storage devices 11b and 11d, Figs. 5A-5B) is a first virtual logical unit (VLUN) and the second storage (i.e. storage devices 11a and 11c, Figs. 5A-5B) volume is a second VLUN (col. 4, lines 29-53).

As to claims 4, 18, 32, Ito teaches acquiring a lock from a lock mechanism (i.e. to temporarily stop the operation of its I/O controller, col. 4, lines 33-39) before modifying the data structure to indicate that the second data is not stored in the second image; and releasing the lock (i.e. to resume the operation of its I/O controller, col. 4, lines 48-53) after storing the second data in the first image (col. 4, lines 29-53).

As to claims 5, 19, 33, Ito teaches the lock mechanism is maintained independent to the first and the second storage images (i.e. further database transactions are directed only to the first set of storage devices 11a and 11c, col. 4, lines 48-53).

As to claims 6, 20, 34, Ito teaches receiving a third data being written to a data block of the second storage volume; updating the data structure to indicate the data block is stored on the

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second storage image; and writing the third data to the data block on the second image (i.e. the automatic recovery mechanism copies data from the backup storage device 11d to the working storage device 11c, col. 8, lines 50-65).

As to claims 7, 21, 35, Ito teaches updating comprises: determining whether the data block is stored on the first storage image (i.e. If a failure occurs in the working storage device 11c, col. 8, lines 59-60); and updating the data structure to indicate the data block is stored on the second storage image, if the data block is stored on the first image (i.e. the automatic recovery mechanism copies data from the backup storage device 11d to the working storage device 11c, col. 8, lines 50-65).

As to claims 9, 23, 37, Ito teaches acquiring a lock from a lock mechanism before the updating (i.e. to temporarily stop the operation of its I/O controller, col. 4, lines 33-39); and releasing the lock after the writing (i.e. to resume the operation of its I/O controller, col. 4, lines 48-53) (col. 9, lines 35-43).

As to claims 10, 24, 38, Ito teaches the lock mechanism is maintained independent to the first and the second storage images (i.e. further database transactions are directed only to the first set of storage devices 11a and 11c, col. 4, lines 48-53).

As to claims 11, 25, 39, Ito teaches receiving a request to read from a data block on the second storage volume; determining whether the data block is stored in the first image or the

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second image, based the data structure associated with the second storage image; reading the data block from the first image if the data block is stored in the first image; and reading the data block from the second image if the data block is stored in the second image (i.e. It is assumed that the working disk #1 encounters a failure at time t3. Then, at time t4, the system attempts to restore the lost data records of the disk #1 by using the backup records in the disk #2, col. 8, lines 15-18) (col. 8, lines 1-26).

As to claims 13, 27, 41, Ito teaches acquiring a lock from a lock mechanism before the determining (i.e. to temporarily stop the operation of its I/O controller, col. 4, lines 33-39); and releasing the lock after the reading (i.e. to resume the operation of its I/O controller, col. 4, lines 48-53) (col. 9, lines 35-43).

As to claims 14, 28, 42, Ito teaches the lock mechanism is maintained independent to the first and the second storage images (i.e. further database transactions are directed only to the first set of storage devices 11a and 11c, col. 4, lines 48-53).

As to claims 44, 45, 46, Ito teaches the second I/O process is capable of accessing the same data, via the second storage volume, as the first I/O process (i.e. the records stored in one database storage subsystem is always an exact copy of the other's, col. 3, lines 1-3).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 3, 8, 12, 17, 22, 26, 31, 36, 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ito et al. (US Patent No. 7,031,986), as applied to claims above, in view of Innan et al. (US Patent No. 7,013,317).

As to claims 3, 17, 31, Ito does not expressly teach examining a lookup table to determine whether there is an entry associated with a data block for the second data, the lookup table being associated with the second storage image; and deleting the entry associated with the data block if the entry exists.

Innan teaches a backup and storage system which has a method for managing first and second storage devices structuring a mirrored pair using first and second update-management tables; the first and second update-management tables corresponding respectively to the first and second storage devices and respectively indicating any update to each of the data blocks of the respective first and second storage devices, col. 2, lines 10-24, Figs. 1, 2).

It would have been obvious to one of ordinary skill of the art having the teaching of Ito and Innan at the time the invention was made to modify the system of Ito to include examining a lookup table to determine whether there is an entry associated with a data block for the second data, the lookup table being associated with the second storage image; and deleting the entry associated with the data block if the entry exists, as taught by Innan. One of ordinary skill in the art would be motivated to make this combination in order to manage a process of updating of data stored respectively in the data blocks of the first and second storage pair in view of Innan, as doing so would give the added benefit of efficiently performing management of generation of backed-up data in a case where storage devices are operated according a mirroring method as taught by Innan (col. 2, lines 4-9).

As to claims 8, 22, 36, Ito does not expressly teach examining a lookup table to determine whether there is an entry associated with the data block, the lookup table being associated with the second storage image; and creating the entry associated with the data block if the entry does not exist.

Innan teaches a backup and storage system which has a method for managing first and second storage devices structuring a mirrored pair using first and second update-management tables; the first and second update-management tables corresponding respectively to the first and second storage devices and respectively indicating any update to each of the data blocks of the respective first and second storage devices, col. 2, lines 10-24, Figs. 1, 2).

It would have been obvious to one of ordinary skill of the art having the teaching of Ito and Innan at the time the invention was made to modify the system of Ito to include examining a

lookup table to determine whether there is an entry associated with the data block, the lookup table being associated with the second storage image; and creating the entry associated with the data block if the entry does not exist, as taught by Innan. One of ordinary skill in the art would be motivated to make this combination in order to manage a process of updating of data stored respectively in the data blocks of the first and second storage pair in view of Innan, as doing so would give the added benefit of efficiently performing management of generation of backed-up data in a case where storage devices are operated according a mirroring method as taught by Innan (col. 2, lines 4-9).

As to claims 12, 26, 40, Ito does not expressly teach examining a lookup table to determine whether there is an entry associated with the data block, the lookup table being associated with the second storage image.

Innan teaches a backup and storage system which has a method for managing first and second storage devices structuring a mirrored pair using first and second update-management tables; the first and second update-management tables corresponding respectively to the first and second storage devices and respectively indicating any update to each of the data blocks of the respective first and second storage devices, col. 2, lines 10-24, Figs. 1, 2).

It would have been obvious to one of ordinary skill of the art having the teaching of Ito and Innan at the time the invention was made to modify the system of Ito to include examining a lookup table to determine whether there is an entry associated with the data block, the lookup table being associated with the second storage image as taught by Innan. One of ordinary skill in the art would be motivated to make this combination in order to manage a process of updating of

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data stored respectively in the data blocks of the first and second storage pair in view of Innan, as doing so would give the added benefit of efficiently performing management of generation of backed-up data in a case where storage devices are operated according a mirroring method as taught by Innan (col. 2, lines 4-9).

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Conclusion

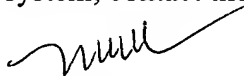
8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Miranda Le whose telephone number is (571) 272-4112. The examiner can normally be reached on Monday through Friday from 8:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R. Cottingham, can be reached on (571) 272-7079. The fax number to this Art Unit is 571-273-8300.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-3900.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Miranda Le
June 15, 2006



GRETAL ROBINSON
PRIMARY EXAMINER